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PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re Patent Application of

TORRES-CARDONA et al

Serial No. 10/685,194

Filed: October 14, 2003

Atty Dkt. 4662-71
C# M#
TC/A.U.: 1625
Examiner: OH, Taylor V.
Date: April 3, 2007

Title: METHOD FOR PRODUCING ESTERIFIED ASTAXANTHIN FROM ESTERIFIED ZEAXANTHIN

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☒ **NOTICE OF APPEAL** Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the Examiner twice/finally rejecting applicant's claim(s).	$500.00 (1401)/$250.00 (2401)	$	500.00
☒ An appeal **BRIEF** is attached in the pending appeal of the above-identified application	$500.00 (1402)/$250.00 (2402)	$	500.00
☒ Credit for fees paid in prior appeal without decision on merits		-$ (	1000.00)
☐ A reply brief is attached.			**(no fee)**
☒ Petition is hereby made to extend the current due date so as to cover the filing date of this paper and attachment(s)	One Month Extension $120.00 (1251)/$60.00 (2251) Two Month Extensions $450.00 (1252)/$225.00 (2252) Three Month Extensions $1020.00 (1253/$510.00 (2253) Four Month Extensions $1590.00 (1254/$795.00 (2254)	$	120.00
☐ "Small entity" statement attached.			
Less month extension previously paid on		-$(	)
	TOTAL FEE ENCLOSED	$	120.00

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our **Account No. 14-1140.** A duplicate copy of this sheet is attached.

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NIXON & VANDERHYE P.C.
By Atty: Bryan H. Davidson, Reg. No. 30,251

Signature:

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

TORRES-CARDONA et al	Atty. Ref.: **4662-71**
Serial No. **10/685,194**	Group: **1625**
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For: **METHOD FOR PRODUCING ESTERIFIED ASTAXANTHIN FROM ESTERIFIED ZEAXANTHIN**

* * * * * * * * * * *

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Commissioner for Patents
P.O. Box 1450
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APPLICANTS' SECOND BRIEF ON APPEAL

Sir:

This Appeal is from the Examiner's twice rejecting claims 1-20, and specifically responds to the issues raised in the non-final Official Action dated December 4, 2006.[1] As will become evident from the following discussion, the Examiner's rejections are in error and, as such, reversal of the same is solicited.

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[1] The claims on appeal appear in the Claims Appendix (Section VIII.) accompanying this Brief. As will be noted below, claims 1-22 remain pending in this application, with claims 21-22 being withdrawn from consideration as directed to a patentably distinct invention non-elected for prosecution herein. Thus, pending claims 1-20 are the claims on which this appeal is based. Non-elected claims 21-22 therefore are not included in the Claims Appendix.

I. Real Party In Interest

The real party in interest is the owner of the subject application, namely DSM IP Assets B.V.

II. Related Appeals and Interferences

No appeals and/or interferences related to this application are pending.

III. Status of Claims

A. The following claims are presently pending in this application and have been twice rejected in the Examiner's Official Action of May 16, 2006: Claims 1-20.

B. The following claims remain pending in this application but have been withdrawn from consideration as being drawn to a patentably distinct invention: Claims 21-22

C. The following claims have been cancelled during prosecution to date: None.

D. The following claims have been allowed: None

IV. Status of Amendments

No amendment subsequent to the Official Action dated December 4, 2006 has been filed.

V. Summary of Claimed Subject Matter

The present invention as defined by pending independent claim 1 is directed toward a method of preparing esterified astaxanthin from zeaxanthin comprising the steps of acylating zeaxanthin in an organic solvent with an acylating agent to produce esterified zeaxanthin, and contacting the esterified zeaxanthin with an oxidizing agent to produce esterified astaxanthin. (Paragraph [0012])

VI. Grounds of Rejection to be Reviewed on Appeal

Claims 1-20 have been rejected under 35 USC §103(a) as allegedly being unpatentable over von Frank Kleazie et al (Helvetica Chimica Acta, vol. 61, Fasc 7(1978), pp. 2609-15) in view of Torres-Cardona et al (USP 5,959,138).

VII. Arguments

1. Claims 1-20 are patentably unobvious under 35 USC §103(a) over von Frank Kleazie et al in view of Torres-Cardona et al .

Applicants note that the present invention relates to a two-step process which comprises the steps of (1) acylating zeaxanthin in an organic solvent with an acylating agent to produce esterified zeaxanthin, and thereafter (2) contacting ***the esterified zeaxanthin*** with an ***oxidizing agent*** to produce ***esterified astaxanthin***.

The Examiner rejects claims 1-20 for alleged obviousness under 35 USC §103(a) based on von Frank Kleazie et al and Torres-Cardona et al. Applicant emphatically disagrees. In this regard, it appears that the rejection advanced is based on a lack of understanding of the present invention and a misreading of the applied publications.

At the outset, applicants agree with the Examiner that Torres-Cardona et al discloses the acylation of zeaxanthin in order to obtain a zeaxanthin di-ester. Applicants also agree that the zeaxanthin di-ester obtained by Torres-Cardona et al may be used as an intermediate, i.e., as a starting material for step (2) according to the present invention. It is really at this juncture, however, that any perceived similarities between the present invention and the applied reference publications cease.

Specifically, there is absolutely no teaching in either von Frank Kleazie et al or Torres-Cardona et al that would suggest to those skilled in the art to combine the reference publications in order to produce esterified astaxanthin from esterified zeaxanthin by ***contacting the esterified zeaxanthin with an oxidizing agent***.

In this regard, it appears that the Examiner has completely misinterpreted the teaching of von Frank Kleazie et al. In this regard, von Frank Kleazie et al most certainly does ***not*** disclose or suggest an oxidation step as defined in the applicants' pending claims. Moreover, the Examiner's comments on page 4, lines 4-5 of the Official

Action dated December 4, 2006 that "*...the invention differs from the prior art in that zeaxanthin is acylated in the presence of an oxidizing agent"* is simply factually erroneous. As noted above, the claimed invention at issue is a two-step process which comprises the steps of (1) acylating zeaxanthin in an organic solvent with an acylating agent to produce esterified zeaxanthin, and then (2) contacting ***the esterified zeaxanthin with an oxidizing agent*** to produce esterified astaxanthin.

The applied references do not disclose or suggest at all the second step as claimed – namely contacting the esterified zeaxanthin with an oxidizing agent to produce esterified astaxanthin. In this regard, von Frank Kleazie et al merely discloses the preparation of astaxanthindiacetat by reacting astaxanthin in pyridine with acetic anhydride, which is, as the process described therein, an acetylation. No ***oxidation*** of astaxanthindiacetat is described or contemplated by von Frank Kleazie et al. Furthermore, sodium sulfate is ***not*** used in the process of von Frank Kleazie et al as an oxidizing agent. Instead, the salt is used as a drying agent in order to dry the organic phase of the acetylation produce (page 2615, lines 1-2). Significantly, none of the oxidizing agents as disclosed on page 3, lines 1-16 of the subject application are even remotely suggested or described in either of the applied reference publications.

Therefore, it appears that the Examiner has blurred the two steps defined by the applicants claim and in so doing has misapplied the reference publications. Such misapplication of the reference publications therefore has resulted in an erroneous rejection being advanced under 35 USC §103(a). Reversal of such rejection is therefore in order.

2. Conclusion.

For the reasons advanced, the Examiner's rejection of claims 1-20 under 35 USC §103(a) is in error and must be reversed. Such favorable action is solicited.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (Original) A method of preparing esterified astaxanthin from zeaxanthin comprising the steps of:

   acylating zeaxanthin in an organic solvent with an acylating agent to produce esterified zeaxanthin; and

   contacting the esterified zeaxanthin with an oxidizing agent to produce esterified astaxanthin.

2. (Original) The method of claim 1, wherein the organic solvent is selected from the group consisting of chloroform and methylene chloride.

3. (Original) The method of claim 1, wherein the acylating agent is selected from the group consisting of RCOOH, RCOCl and $(RCO)_2O$, wherein R is a hydrocarbon chain of 2-20 hydrocarbons.

4. (Original) The method of claim 3, wherein R is a hydrocarbon chain of 2-8 hydrocarbons.

5. (Original) The method of claim 3, wherein R is a hydrocarbon chain of 2-4 hydrocarbons.

6. (Original) The method of claim 3, wherein the acylating agent is acetic anhydride.

7. (Original) The method of claim 1, wherein the oxidizing agent is produced by mixing a saturated aqueous solution selected from the group consisting of sodium sulfite, potassium sulfite, sodium hydrogen sulfite, potassium hydrogen sulfite, sodium bisulfite and potassium bisulfite, with a saturated solution of a bromate salt.

8. (Original) The method of claim 7, wherein the oxidizing agent is produced by mixing a saturated aqueous solution of sodium bisulfite with a saturated solution of sodium bromate.

9. (Original) The method of claim 8, wherein the ratio of sodium bisulfite to sodium bromate is 1.5:1.

10. (Original) The method of claim 7, wherein the oxidizing agent is produced by mixing a saturated aqueous solution of sodium bisulfite with a saturated solution of potassium bromate.

11. (Original) The method of claim 7, wherein the oxidizing agent is produced by mixing a saturated aqueous solution of sodium bisulfite with a saturated solution of calcium bromate.

12. (Original) The method of claim 7, wherein the oxidizing agent is produced by mixing a saturated aqueous solution of sodium bisulfite with a saturated solution of cerium bromate.

13. (Previously Presented) The method of claim 1, which is practiced at a reaction temperature between 0 to 25^0C.

14. (Previously Presented) The method of claim 7, wherein the oxidizing agent and the zeaxanthin esters are present in a ratio of the oxidizing agent to the zeaxanthin esters of between 0.5 to 5 parts for each part of carotenoid.

15. (Previously Presented) The method of claim 7, wherein the aqueous oxidizing agent has a pH of between 1 to 4.

16. (Previously Presented) The method of claim 2, wherein the organic solvent and zeaxanthin esters are present in a ratio of the organic solvent to the zeaxanthin esters of between 5 to 40 parts for each one.

17. (Original) The method of claim 1, wherein the zeaxanthin is obtained by saponification of a plant extract.

18. (Original) The method of claim 17, wherein the plant is marigold.

19. (Original) The method of claim 1, wherein the zeaxanthin is prepared synthetically.

20. (Original) The method of claim 1, further comprising the step of washing the esterified zeaxanthin with water before contacting the esterified zeaxanthin with the oxidizing agent.

IX. EVIDENCE APPENDIX

[NONE]

X. RELATED PROCEEDINGS APPENDIX

[NONE]